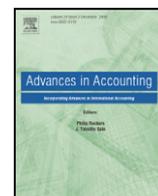




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Overpaid acquisitions and goodwill impairment losses – Evidence from the US



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ABSTRACT

The purpose of this study is to shed light on the reliability of accounting goodwill numbers by examining whether many goodwill impairment losses arise from overpayment for the target at the time of the acquisition, rather than from a subsequent deterioration of goodwill values. A second related objective is to assess whether the goodwill impairment test introduced by SFAS 142 improved the ability of accounting standards to timely capture situations in which the amount of goodwill is overstated and should thus be written down.

For a sample of 929 US acquisitions first, I found that certain acquisition characteristics represent powerful indicators of subsequent goodwill impairments, suggesting that SFAS 141 is at least partially unable to avoid components other than “core goodwill” being included in goodwill. I also found that SFAS 142 annual impairment tests improved the timeliness of recognizing goodwill write-offs, eventually helping to mitigate the failure of SFAS 141.

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1. Introduction

Accounting rules on business combinations have dramatically changed during the last ten years, both in the US and in Europe as result of a common effort of the standard setters toward the international convergence of accounting rules. The new standards abolished the pooling of interest, introducing a single method to account for business combination transactions, the purchase method, and eliminated the amortization of goodwill after acquisition, instead requiring that goodwill be tested for impairment at least annually.

Under SFAS 141, goodwill arises at acquisition as a residual value when the amount paid to acquire a company is higher than the fair value of the identifiable net assets of such a company. The amount of goodwill is separately recorded as an asset in the acquiring company's balance sheet.

According to SFAS 141, goodwill values should embody essentially two elements (referred to as “core goodwill”): the fair value of the going concern of the target's business as well as the fair value of the synergies expected from combining the acquiring and target firms' businesses. Thus the statement claims for a careful assessment of goodwill values by the acquiring entity at the acquisition date, so that components other than core goodwill are minimized.

The main objective of this study is to shed light on the reliability¹ of accounting goodwill numbers by examining the causes of goodwill impairment losses. One way to accomplish this task is to determine whether goodwill impairment losses are predictable. More specifically,

I hypothesized that the cause of many goodwill impairment losses is that the target firm was overpaid at the time of the original acquisition, as signaled by certain proxies for overpayment, rather than the subsequent occurrence of events leading to a performance deterioration of the reporting unit (or units) the acquired goodwill was allocated to. This understanding is essential for investors, financial statement users and standard setters as evidence that goodwill impairment losses can be predicted based on certain measures indicating overpayment at acquisition would signal that SFAS 141 is at least in part unable to avoid those components other than core goodwill being subsumed in goodwill.

Moreover, understanding whether goodwill numbers are reliable is especially important because of the magnitude of those numbers. In fact as a result of the above depicted changes in the reporting regime, the amounts of goodwill recorded in the financial statements of many corporations have risen considerably.²

A second related objective of my analysis is to test whether the requirement for annual impairment tests of goodwill imposed by SFAS 142 improved the ability of accounting standards to timely detect situations in which the amount of goodwill should be written down, helping to mitigate the above described failure of SFAS 141.

I tested these hypotheses for a sample of 929 acquisitions made by US public traded companies over the nine-year period from 1999 to 2007. I tracked those acquisitions forward from the transaction date to September 2009 in order to detect goodwill impairment losses, if

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¹ Concepts Statement No. 2 *Qualitative Characteristics of Accounting Information* par. 77–80.

² Hayn and Hughes (2006) highlighted that the mean value of goodwill to total assets for all firms included in the Compustat database increased from a 10.8% in 1988 to a 16.8% in 2001.

any. I then examined whether the occurrence of the observed goodwill impairment losses could have been predicted based on the overpayment indicators measured at the acquisition date that I included in the model.

First I found that approximately a 40% of subsequent goodwill impairment losses were predictable based on overpayment indicators at acquisition, suggesting that in those instances the amount of goodwill was overstated at inception. Among the overpayment indicators included in my model only the percentage of the purchase price paid for with stock of the acquiring firm, the amount of goodwill in relation to the purchase price and the excess of purchase price over the book value of assets of the target firm are significant measures, whereas other variables have no explanatory power. In particular, the percentage of stock in the consideration is the most significant predictor and has a strong and positive association with the probability of an impairment loss, signaling that acquisitions paid for predominantly with the acquiring firm stock are more likely to result in a goodwill impairment loss after acquisition than are cash acquisition. This result suggests that managers are likely more prone to overpay for the target in stock acquisitions as probably they are more sensitive to potential losses of cash in cash acquisitions rather than to the dilutive effect of stock.

The amount of the purchase price assigned to goodwill is also strongly and positively related to the impairment loss event. That is, the likelihood of having an impairment loss increases the higher the amount of goodwill on the acquisition price. This result points out that when the percentage of the acquisition price assigned to goodwill is significant, the value of goodwill is more likely to include elements different from the synergies expected from the combination and the going-concern value of the target firm, and thus it is unlikely to offer a faithful and realistic representation of the underlying economics.

In addition, my analysis confirms that SFAS 142 was probably necessary. I found that the average time lag between the acquisition date and the recognition of an impairment loss ranges from 2 to 3 years. Results of an earlier study³ showed that, before the enactment of SFAS 142, the average time lag between the acquisition and the recognition of a subsequent impairment loss was four to five years, indicating that goodwill was more likely to be kept untouched on the books after its economic deterioration. Therefore, my findings show that the application of SFAS 142 improved the ability of accounting standards to more timely detect situations in which the amount of goodwill should be written down, substantiating the hypothesis that SFAS 142 eventually helps to mitigate the failure of SFAS 141 described above.

This study contributes to extant accounting literature in several respects. First, it sheds some light on the reliability of accounting goodwill numbers providing evidence that certain indicators of overpayment can affect or predict the occurrence of a subsequent impairment loss when an acquisition is consummated. This result is particularly relevant for auditors, investors and other financial statement users as it helps to identify factors that should be considered in evaluating the management determination regarding the purchase price paid and the value of goodwill recognized at acquisition. Furthermore, this study corroborates the results of prior research on goodwill impairment prediction and gives additional indications stemming from the analysis of the post-SFAS 141 period. While previous research on predicting goodwill write offs focused on the analysis either of write-offs occurred during the 2002–2003 transition year, or of write-offs occurred even before, there is no study analyzing acquisitions and subsequent goodwill impairments occurred during the eight-year period to date after the issue of SFAS 141 and SFAS 142.

Finally, my findings provide empirical evidence in support of SFAS 142 requirements for the annual impairment test of the acquired goodwill showing that it have in fact improved the timeliness of recognizing goodwill impairment losses.

The remainder of the study is organized as follows. Section 2 describes the accounting standards for business combinations and goodwill. Section 3 details the research issues related to prior literature. Section 4 explains the research method and the sample selection. Section 5 provides the empirical results. Section 6 concludes the study.

2. SFAS 141 and SFAS 142

For more than thirty years business combinations and goodwill in the US had been accounted for according to the provisions of Accounting Principles Board Opinion (APB) No.16, *Business Combinations* and Accounting Principles Board Opinion No.17, *Intangible Assets*. As a result of the common effort by the FASB and the IASB toward the international convergence of accounting standards, the FASB issued SFAS 141 and SFAS 142 in 2001, and SFAS 141R in 2007, which superseded the provisions of previous standards.

SFAS 141 and SFAS 142 modified in essence accounting for mergers and acquisitions requiring all business combinations initiated after June 30, 2001 to be accounted for using one method of accounting, the purchase method,⁴ and abolishing goodwill amortization in favor of the annual impairment test of the acquired goodwill.

According with SFAS 141, the application of the purchase method⁵ gives rise to goodwill if the cost exceeds the fair value of the net assets acquired.⁶ As of the acquisition date, in order to test goodwill for impairment an entity is required to assign *all* goodwill acquired in a business combination to one or more reporting units.⁷

SFAS 141 maintains that goodwill acquired in a business combination is an asset, whose value includes six components⁸: the first is the excess of the fair values over the book values of the assets acquired and liabilities assumed in the acquired entity as of the date of the acquisition; the second component includes the fair values of assets and liabilities not previously recognized in the acquiree financial statements; the third component represents the fair value of the going-concern element of the acquired firm business⁹; the fourth element is unique to each specific combination as it embodies the fair value of the synergies and other benefits expected from combining the acquirer's and acquiree's net assets and businesses; the fifth component of goodwill is the value of measurement errors made by the acquiring firm in valuing the target firm, resulting in an overvaluation of the consideration paid for the target; finally, the sixth element is the overpayment (or underpayment) by the acquirer, which might arise from auction-like situation, when one or more bidders are competing for the target (overpayment), or from distress or fire sales (underpayment).

The value of goodwill – which the FASB refers to as core goodwill – acquired in a business combination should be represented only by the third and fourth component, as the other four elements do not meet the definition of asset.¹⁰ For this reason, the FASB claims, SFAS 141 provisions are specifically designed to avoid subsuming in the value of goodwill recognized at acquisition components that are not part of core goodwill.¹¹ Moreover, including in goodwill elements other than

⁴ Even though SFAS 141(R) carries forward the fundamental provisions of SFAS 141 about identification of the acquirer and the application of one method of accounting for all business combination, some aspects related to the application of the purchase method of accounting have been modified (i.e. scope of the statement; method of accounting for business combination, which is no longer called “purchase method” but is rather referred to as “acquisition method”; provisions on step acquisitions, on assets and liabilities arising from contingencies, and on contingent consideration).

⁵ SFAS 141, Paragraphs 37–42.

⁶ SFAS 141, Paragraph 43.

⁷ SFAS 142, Paragraph 34.

⁸ SFAS 141, Appendix B, Paragraph B 102.

⁹ An entity's “going concern” element is defined as “the ability of the established business to earn a higher rate of return on an assembled collection of net assets than would be expected if those net assets had to be acquired separately” (SFAS 141, Appendix B, Paragraph B 102).

¹⁰ SFAS 141, Appendix B, Paragraph 103–105.

¹¹ SFAS 141, Appendix B, Paragraph 106.

³ Hayn and Hughes (2006).

core goodwill would constitute a “serious breach of representational faithfulness” of goodwill numbers included in financial statements.¹²

After acquisition, goodwill acquired in a business combination is accounted for according with the provisions of SFAS 142 *Goodwill and Other Intangible Assets*.¹³

The primary goal of the FASB for undertaking the business combinations project was to “improve the transparency of the accounting for business combinations” and the objective of this analysis is to test whether SFAS 141 and SFAS 142 provisions in fact reached the goal. That is, they effectively guarantee that goodwill amounts recognized in a business combination at acquisition are reliable and give a realistic representation of the underlying economic substance.

3. Literature review and hypotheses

Whereas previous research has expressed a relative agreement on the nature of goodwill and its value relevance,¹⁴ some concern has been conveyed on the reliability of goodwill numbers,¹⁵ which is the ability of those numbers to reflect future benefits and actual resources. Some researchers have criticized the FASB position in SFAS 141 and 142, claiming for more conservatism.¹⁶

For example, Watts (2003a,b) summarized the empirical evidence on conservatism in accounting and some detailed reasons in favor of conservatism and its implications for regulators. He affirmed that new standards on business combinations and goodwill have introduced unverifiable estimates into financial reporting, particularly when they require firms to test goodwill for impairment. The result is an increased potential for manipulation of earnings and net assets values.¹⁷

Holthausen and Watts (2001) argued that fair values are reliable and relevant measures of the “true value” (i.e. measurement errors and bias are minimized) when actively traded market prices in liquid markets exist. Whereas this is likely to be the case for example of investment securities, for other assets fair values are unverifiable as traded market prices are not available, therefore valuation models used in value-relevance studies are probably poorly descriptive.

Consistent with these concerns, some authors studied how managerial discretion affects goodwill reporting, possibly resulting in earnings manipulations.

Francis, Hanna, and Vincent (1996) examined the causes and the effects of discretionary asset impairments, occurred after the issuance of SFAS 121 *Accounting for the Impairment of Long Lived Assets and for Long-lived Assets to be Disposed*; they found that whereas impairment better explains write-offs of assets like inventory and property, plant and equipment, managerial incentives are the most significant explanatory factor with respect to write-offs of a more discretionary item like goodwill.

Chen, Kolhbeck, and Warfield (2004) analyzed goodwill write-offs recognized in the year of transition from APB 16–17 to SFAS 142 and found that SFAS 142 provisions resulted in a more timely recognition of goodwill impairment losses and therefore in an improved quality of financial reporting, which better mirrors the underlying economics.

Beatty and Weber (2006) analyzed the SFAS 142 transitional provisions, focusing on the factors that may affect the management decision to take a transitional goodwill impairment versus delaying it. Findings showed that firms with earnings-based bonus plans

that include special items and CEO with relatively longer tenures are less likely to take a transitional impairment loss.

Ramanna and Watts (2007) studied a sample of 124 firms with impairment indications (book goodwill and book to market ratio higher than one for two consecutive years) over a three-year period from 2003 to 2006 to test whether managers use the discretion given in SFAS 142 fair value estimates to convey private information to the market about positive future cash flows or rather to opportunistically manipulate financial reports, as predicted by agency theory. The authors found a 69% frequency of non-impairment in the sample, a potential signal that managers used their discretion to avoid goodwill write-offs, and a positive association between goodwill write-offs and some firm's characteristics that facilitate management discretion (i.e. number and size of reporting units and the proportion of net assets that are unverifiable).

Ramanna (2008) provides evidence that SFAS 142 provision was at least in part the result of political pressures from firms with characteristics suggesting they will use opportunistically the increased discretion potential in values estimates allowed by SFAS 142.

Recognizing that the market regards goodwill as an asset in valuing a company and that managers may use the discretion embedded in fair value estimates to opportunistically manipulate a company financial statements makes even more relevant to assess whether the goodwill value is overstated at acquisition and whether financial statements' users are able to catch its impairment based on the information gleaned from financial statements. Moreover, a large discretionality is embedded in the purchase price determination mandated by SFAS 141. As goodwill arises when the purchase price paid by the acquiring firm exceeds the fair value of identifiable net assets acquired, if the acquiring firm's management believes that future impairment is unlikely it may want to push up the purchase price claiming for the expected synergies of the combination. Thus, individuating some overpayment indicators to be used as early warning signs at acquisition can be a valuable help to accomplish the task of assessing the suitability of an acquisition and its potential implications for a company's future performance.

Only a few studies address the issue of reliability of goodwill numbers by examining goodwill impairment losses.

Hayn and Hughes (2006) studied the predictability of goodwill write-offs based on the information available, both at acquisition and after, aiming at defining whether financial disclosures required by SFAS 142 about the firm's business segments are actually sufficient to allow investors and other financial statement users to assess the existence and timing of a goodwill impairment loss. They hypothesized that both certain variables at acquisition and some indicators of a reporting unit performance over the years following the acquisition are helpful to explain the occurrence of goodwill impairment. The empirical analysis was conducted for a sample of 1276 acquisitions over the eleven-year period from 1988 to 1998, as disclosure requirements on goodwill and business segments were similar to those mandated by SFAS 142. The results show that indicators based on acquisition characteristics explain goodwill write-off better than reporting units' performance indicators, which weekly contribute to the loss prediction. The full model correctly classified goodwill write-offs for 42% of the total number of write-offs actually occurred. Among the acquisition characteristics, the premium paid by the acquirer had a positive relation with the impairment loss, like the amount of purchase price allocated to goodwill and the percentage of consideration paid in stock whereas other acquisition characteristics (e.g. number of bidders competing for the target and number of acquisitions made by the acquiring firm) were unable to discriminate between companies in the impairment and non-impairment samples. As for performance indicators, only the segment-level ROA and the change in firm-level ROA had some weak explanatory power, suggesting that investors and financial statement users are eventually unable to assess management determination on goodwill impairment, based on the current disclosures requirements. This is especially true

¹² SFAS 141, Appendix B, paragraph 132.

¹³ SFAS 141, Paragraph 47.

¹⁴ See for example, Chauvin and Hirschey (1994), McCarthy and Schneider (1996), Jennings, Robinson, Thompson, and Duvall (1996), Henning et al. (2000), Jennings, LeClere, and Thompson (2001), Moehrl, Reynolds-Moehrl, and Wallace (2001), Hirschey and Richardson (2002), Henning and Shaw (2003).

¹⁵ See for example Wyatt (2008).

¹⁶ Conservatism is “the differential verifiability required for recognition of profits versus losses. Its extreme form is the traditional conservatism adage: “anticipate no profit, but anticipate all losses.” (Watts, 2003a,b), Conservatism in Accounting – part I.

¹⁷ Watts (2003a,b), Conservatism in Accounting – part I, 217.

when the impairment stems from a performance deterioration at reporting unit level over the years following the acquisition. The authors also found that for a large number of write-offs, goodwill value had deteriorated on average three to four years before the impairment loss, casting some doubt on the credibility of goodwill numbers reported in financial statements and on the reporting regime introduced by SFAS 142.

Gu and Lev (2008) hypothesized that goodwill impairment losses are the consequence of acquisitions, often ill-advised, made by firms whose share prices were overvalued at the time of the original transaction. The authors argued that share mispricing represents a strong incentive to firms' management to engage in business acquisitions, even if the price paid is too high and the strategic motivations are weak, in order to give their company the aura of continuous growth and so "buy themselves out" of the subsequent price correction. The authors found first a positive relationship between share overpricing and the number and size of corporate acquisitions and second a positive monotonic relation between share overpricing and increases in the amount of goodwill recorded, signaling potential overpayment and thus future possible goodwill impairment. In addition, their results show that the acquirer's share overpricing at acquisition is a good predictor of both the occurrence and the size of subsequent goodwill impairments losses, along with the amount of goodwill relative to total assets, the percentage of price paid with stock, the number of acquisitions made by the acquiring firm and the target geographic location.

Li, Shroff, and Venkataraman (2011) examined a sample of US companies that announced transitional goodwill impairments in 2002–2003 to test whether the recorded losses were the result of overpayment for the target at time the acquisition was consummated and/or the consequence of subsequent events. The authors used several indicators to capture overpayment at acquisition and the acquiring firm security return over a period of one year starting on day +3 relative to the acquisition announcement date as indicator of the firm's performance subsequent to the acquisition. The authors found first a significant and positive relationship between goodwill impairment losses and the amount of purchase price paid in excess of the target book value, and second a significant and negative relation between the loss and the company performance during the year following the acquisition, signaling that impairment losses arose in part from initial overpayment for the acquiree and in part from subsequent events. Overall their results show that for overpaid targets (i.e. purchase price was significantly higher than target book value of equity) goodwill of the acquiring firms was impaired much before the recognition of the impairment loss.

Overall, the results of these studies show that many goodwill impairment losses are predictable based on the information available at acquisition, as generally the variables embodying the information measured after acquisition perform poorly in predicting goodwill impairment losses, therefore supporting the idea that in several instances the value of goodwill is in fact overstated at inception.

My analysis aims first at evaluating the reliability of accounting goodwill numbers by studying whether goodwill impairment losses can be detected based on certain indicators measured at the date a business combination is consummated, and indicating potential. Post acquisition measures are excluded, as they poorly describe the phenomenon, according with prior literature summarized above.

If a goodwill impairment loss can be individuated based on the information available at acquisition this suggests that the amount of goodwill was initially at least in part overstated, and therefore impaired before the loss was in fact recognized. Conversely, assuming that the prediction model is valid and effectively captures the impairment indicators, failure to predict future impairment losses suggests that generally the value of goodwill recorded in the companies' financial statements properly prices the synergies expected from a combination as well as the acquired business going concern value. That is, components other than core goodwill are minimized, as required by SFAS 141, and the

impairment loss should be attributed to events subsequent to the acquisition.

A second related objective of this study is to test whether the requirements for annual impairment tests of goodwill imposed by SFAS 142 help to improve the reliability of goodwill numbers, resulting in more timely recognition of goodwill impairment losses. As an analyst said: "Under the old rules, goodwill was being amortized, so you knew that companies were eating into it [...]. Now it's going to be hanging around, so it can have much more of an impact in a single stroke, when it is written-off".¹⁸

4. Methodology and sample

Following a similar approach to that used in Hayn and Hughes (2006) I developed my predictive model using certain indicators of potential overpayment measured at the acquisition date.

Since the overpayment phenomenon is difficult to observe directly, I identified some proxies to capture the probability of overpayment drawing on both the accounting standards and the financial accounting literature.

The FASB 1999 Exposure Draft distinguished four acquisition characteristics that may indicate impairment of the goodwill acquired in a business combination: (1) payment of a significant premium relative to the purchase price paid; (2) an auction-like situation or the presence of multiple bidders that are competing for the target; (3) use of the acquirer's stocks as the primary form of consideration; (4) a considerable amount of goodwill relative to the acquisition price.¹⁹

The premium paid by the acquiring firm over the market value of the target represents the expectations of the acquirer about the future benefits arising from the combination and the future performance of the acquired entity. Even though the purchase price in excess of the target market value may correctly price the synergistic gains that the acquirer's management expects to obtain from the combination, a significant premium paid may signal overpayment and therefore overstatement of goodwill. Some previous studies give credence to this variable (for example, Hayn & Hughes, 2006). I calculate the first indicator, the premium paid (PREM) as the difference between the enterprise value of the target firm (EV) and the target market value of assets (MVAss), standardized by the target market value of assets. The enterprise value of the target firm is the purchase price paid by the acquiring firm plus the financial debt assumed, including the net deferred tax position, as of the acquisition date; the target market value of assets is defined as the sum of the target market value of equity (number of common shares outstanding multiplied by stock price) four weeks prior to the date of the announcement of the transaction plus the financial debt assumed, including the net deferred tax position.

As for the second indicator, previous studies evidence²⁰ supports the hypothesis that an auction-like situation potentially leads to

¹⁸ Caplan & Harris (2002), p. 53.

¹⁹ The Financial Accounting Standards Board (FASB) (1999), par.26, required firms to reassess the value of goodwill according to SFAS 121 *Accounting for the Impairment of Long-lived Assets and Long-lived Assets to Be Disposed Of*, in the presence of one or more of these indicators. These acquisition characteristics were then excluded from SFAS 141 that simply states that entities "should make every effort to (a) measure the purchase consideration accurately, (b) to record fair values rather than book values of net assets acquired, and (c) to ensure that all intangible assets not previously recorded are recorded so that those items are not included in hat that is recognized as goodwill" (SFAS 141, par. B146).

²⁰ Roll (1986), and Varaiya and Ferris (1987) found evidence supporting the winner's curse in corporate takeovers. Giliberto and Varaiya (1989) found that the presence of more than one bidder in auctions to acquire failed banks increases the magnitude of the winning bidder, suggesting that the acquirers is more likely to overpay when multiple bidders are competing for a target firm. Rau and Vermaelen (1998), and Weidenbaum and Vogt (1987) also provide evidence that of acquiring firms tend to systematically overpay in auction-like situations.

overpayment by the acquiring firm, consistent with the so called “winner curse”.²¹ On the other hand, Hayn and Hughes (2006), and Li et al. (2011) show that the presence of more than one bidder is not related to the recognition of an impairment loss, perhaps due to the small number of competing bidder for the acquisitions included in their samples. I codified the presence of multiple bidders (CHALL), as a dummy variable that assumes the value of 1 if one or more bidders were competing for the target and 0 otherwise.

Results of previous research also corroborate the idea that the mode of consideration matters as indicator of overpayment. Many studies show that the acquiring firms are more prone to use their stocks to pay for the target when they believe their stocks are overvalued by the market. Managers may perceive their stock, especially when overvalued, as a cheap currency and thus overpayment may arise more frequently as acquiring firms are likely more sensitive to potential loss of cash than to the dilutive effect of stock in negotiating the purchase price. In addition, overvalued stocks may represent for firms' managers an incentive to overinvest, even paying an excessive price or without strategic fit, in order to avoid the price correction or to hide the overpricing from investors, or to give shareholders the feeling of growth (Gu & Lev, 2008). Myers and Majluf (1984) results show that managers of the acquiring firm tend to use stocks as a mode of consideration when they believe that their stocks are overvalued, as managers will issue new equity only when they perceive their firm is overvalued. Erickson and Wang (1999) investigate earning management attempts by acquiring firms and found that, when stocks are used as a medium of payment, management of the acquiring firm tried to manage their earning upward before the merger, thus raising their stock prices in order to reduce the cost of the target. Shleifer and Vishny (2003) found that managers of acquiring firms tend to use stock as consideration when they perceive that those stocks are overvalued by the market.²²

Consistently, Hayn and Hughes (2006) found that goodwill acquired in stock deals is more likely to be impaired over the years following the acquisition, suggesting that those targets were probably overpaid.

I included the form of the consideration received by the acquired firm in the variable STOCK. STOCK is measured as the percentage of the purchase price paid for with the acquirer's stock and ranges from 0 for all-cash transactions to 1 for the acquisitions entirely paid for with stock.

The rationale for the fourth indicator is that since goodwill is only computed as a residual value under SFAS 141, the assessment of the amount of goodwill to be recognized at acquisition involves more subjectivity and judgment than other assets; as a result, the acquiring firm is more likely to have overpaid the higher the amount of goodwill relative to the purchase price. The results of previous studies substantiate this hypothesis. For example, Hayn and Hughes (2006) found a significant positive relationship between the amount of acquisition cost assigned to goodwill and the occurrence of an impairment loss. Gu and Lev (2008) found that firms recording goodwill write offs have higher amount of goodwill relative to total assets, suggesting that the amount recorded as goodwill was at least partially overstated. I measured the amount of goodwill relative to the purchase price (GWEV), as the percentage of the enterprise value of the target firm (purchase price plus financial debt assumed including the net deferred tax position) that the acquirer allocated to goodwill.

²¹ McAfee and McMillan (1987) describe this phenomenon in common value auctions: “When the item being bid for has a common value, the phenomenon dramatically named the “winner's curse” can arise. Each bidder [...] makes his own estimate of the true value of the item. The bidder who wins is the bidder who makes the highest estimate. Thus there is a sense in which winning conveys bad news to the winner, because it means that everyone else estimated the item's value to be less.” (McAfee & McMillan, 1987, 720–721).

²² See also Loughran and Vijh (1997), Rhodes-Kropf and Viswanathan (2003), Ang and Cheng (2003), Gu and Lev (2008).

In addition to the acquisitions characteristics identified by the FASB in the 1999 ED, I included some other variables identified by the accounting literature that may indicate overpayment.

First the amount of purchase price paid in excess of the book value of the target firm (book value premium). Li et al. (2011) found that the book value premium gives a substantial contribution to explain the impairment loss event. Henning, Lewis, and Shaw (2000) observed that the overpayment component of the difference between acquisition price and target book value is written-off by the market during the year following the acquisition, even though it might be that the market valuation is not immediately included as accounting loss in financial statements. I measured the book value premium (BVPREM) as the extent to which the enterprise value of the target firm exceeds the book value of assets of the target, as of the date of the most current financial information prior to the transaction date. The resulting difference is standardized by the book value of assets of the target firm to obtain the BVPREM as a percentage.

Second, the relationship between the business of the acquired and the acquiring firm. Some authors found that the lack of relation between the target and the acquirer's main businesses may represent an indicator of overpayment for the acquisition, suggesting that on average focus-enhancing acquisitions are more successful than diversifying acquisition (for example, DeLong, 2001; Maqueira, Megginson, & Nail, 1998; Megginson, Morgan, & Nail, 2002; Morck, Shleifer, & Vishny, 1990, and Sicherman & Pettway, 1987). On the other hand, a few studies found no statistically significant association between the deal strategic motivation (diversification versus focus) and the success of an acquisition (for example, Li et al., 2011). In order to assess whether a transaction is focus enhancing for the acquirer firm or it increases the acquirer's diversification, I codified a dummy variable, FOCUS, equals to 1 if the target belongs to the same 2-digit SIC as the acquirer, and 0 otherwise.

Third the geographic location of the target and the acquiring firm. Most of previous studies found that buyers of foreign targets earn returns not significantly different from zero (for example, Markides & Ittner, 1994; Yook, Gangopadhyay, & McCabe, 1999). However, cross-border M&A are generally deemed more challenging in terms of pre-merger valuations and subsequent integration of the combining companies; in addition they may be disruptive, in terms of unanticipated entry by other competing buyers, higher purchase prices and errors in strategic assumptions (Bruner, 2004). Gu and Lev (2008) support this hypothesis, finding a positive relationship between the geographic location of the target firm and the occurrence of a subsequent goodwill impairment loss. Specifically they show that acquisitions of foreign targets are more likely to result in subsequent goodwill impairment losses, perhaps due to the lower quality of the information about the target firm. To include the geographic location of the combining firms I identified a dummy variable (CROSS), coded 1 if the target was a foreign company (cross-border acquisition) and 0 if the target was a US company (domestic acquisition).

Finally, I considered the size of the target firm (SIZE), measured as the target market value of assets four weeks prior to the date of the announcement of the transaction.

Combining these overpayment indicators measured at the acquisition date I obtained the following prediction model, where subscript *i* indicates each specific transaction included in the sample. To identify a subsequent impairment loss I created a dummy variable (ILOSS), which is equal to 1 if goodwill recognized in acquisition *i* was subsequently impaired, and 0 if no impairment has been detected.

$$ILOSS_i = \beta_0 + \beta_1 GWEV_i + \beta_2 STOCK_i + \beta_3 PREM_i + \beta_4 BVPREM_i + \beta_5 FOCUS_i + \beta_6 CHALL_i + \beta_7 CROSS_i + \beta_8 SIZE_i + \varepsilon_i \quad (1)$$

4.1. Sample and data

In order to predict the occurrence of goodwill impairments losses due to overpayment at acquisition, and to jointly test the effect of the application of SFAS 141 and SFAS 142 I needed to select a period long enough to build a representative sample and, thus to allow reasonable estimates.

My initial sample of acquisitions included all deals made between 1999 and 2007 that were in the Deals Analysis section of the Thomson One Banker,²³ Core Package database. I incorporated all acquisitions meeting the following criteria:

- The acquiring and the acquired firms were publicly traded on US stock exchanges;
- The acquirer's nation was the US;
- The effective date of the transaction was between January 1, 1999 and December 31, 2007;
- Data on the purchase price, the debt assumed, the form of consideration, and the number of bidders were available on the acquisition date;
- The deal was completed (not pending).

My search included all SIC Divisions, excluding financial services (Division H); public administration (Division J) and agriculture (Division A).

Applying these searching criteria resulted in 2022 acquisitions over the 9 year period. I deleted from the selected sample 496 transactions from 1999 to 2001 as they were accounted for using the pooling of interests method and therefore did not give rise to goodwill.

In order to detect companies which recorded goodwill impairment losses, I searched the Compustat database. I then eliminated 41 acquiring firms that did not have data on Compustat for the selected fiscal year range, resulting in a sample of 1485 transactions.

To validate the information obtained from Thomson One Banker and Compustat databases I checked the acquiring firms' annual report (Form 10K), quarterly reports (Form 10Q), agreements and plans of merger (Form S-4) and current reports (Form 8-k) for the year the transaction had been consummated.

The 1485 sample included 572 deals whose date effective was before December 1st, 2001 (effective date of both SFAS 141 and SFAS 142), and therefore were accounted for following the provisions of APB Opinion No.16, APB Opinion No. 17, and SFAS 121. Under Opinion 16 a business combination was accounted for either as a pooling or as a purchase. Pooling transactions are excluded from my dataset. Thus, since SFAS 141 did not substantially change the provisions of Opinion 16 related to the application of the purchase method, it is reasonable to assume that including those transactions does not introduce a distortion in the analysis. Moreover, the period selected allows a more comprehensive understanding of the effects of SFAS 142 as both transitional impairments and non transitional impairments were detected during a relatively large number of years after the enactment of the new Statement.

Finally, before the enactment of SFAS 142, in addition to be amortized, goodwill was tested for impairment according to SFAS 121. SFAS 142 introduced more restrictive provisions for annual impairment test. However, as my dependent variable is the occurrence of an impairment loss, rather than its amount, SFAS 121 impairments do not undermine the validity of the analysis. Conversely, the reporting regime shift allows assessing whether SFAS 142 provisions eventually improved the ability of accounting standards to detect an impairment loss and resulted in a more timely recognition of goodwill impairment losses.

Under the provisions of SFAS 141 and 142 the acquiring firm is required to allocate the net assets acquired, including goodwill, to one or more reporting units at the date of the acquisition; as for subsequent periods goodwill allocated to the company's reporting units is tested for impairment at least annually. Thus, for the transactions consummated before 2001 I identified the business segment or segments to which the acquired goodwill was allocated in order to mirror the SFAS 142 reporting regime as closely as possible. In some cases the acquiring firm financial statements disclosure made this task relatively straightforward; in other cases I analyzed the acquiring firm's press releases and/or quarterly reports and the acquired firm's financial statements to obtain this information. As a result I deleted 306 observations from the sample because they had been accounted for as pooling of interests; the amount of goodwill acquired and/or the purchase price and the amount of acquired firm debt assumed were either undisclosed or disclosed in aggregate for different transactions completed during the year which were deemed individually immaterial; the reporting segment or segments the acquired goodwill was allocated to could not be identified. The acquisitions meeting my criteria were 1179, a 79.4% of the deals for which Thomson and Compustat data were available.

In order to detect subsequent goodwill impairments, if any, for each acquisition, I tracked the acquisitions in the full sample over the period subsequent to the combination forward through 2009, analyzing the acquirer's financial statements and the related notes, and the quarterly reports, including quarterly reports for fiscal 2009.²⁴

When a goodwill impairment loss or a goodwill write-off was discovered, I established the amount of the impairment, the acquisitions or the reporting unit/units (segment/segments) it pertained to and the underlying motivation, if given.

For the 55 transactions I could not track the acquired goodwill through the selected period as there was not enough detail about the allocation of goodwill or the company engaged in segments restructuring during the years following the acquisition. Thus I eliminated them from the sample.

Moreover, to calculate the premium price and the excess of purchase price over the book value of the target at the acquisition date, I required target firms to have both a market value and a book value. 79 deals were deleted from the sample as the target was either a bankrupt company which had been previously delisted (thus market value was not available) or a non US firm for which I was not able to find the market and/or the book value.

A total of 929 acquisitions met my requirements (or a 43.71% of my initial sample). I refer to this set of companies as the "full sample".

In all, I identified 393 acquisitions (or the 42.30% of the "full sample") resulting in a goodwill impairment or write-off. I refer to these acquisitions as the "impairment sample".

For 536 acquisitions (57.70% of the "full sample") I did not detect a goodwill impairment loss through 2009, the last year of my sample, thus I refer to these transactions as the "non-impairment sample".

5. Empirical results

5.1. Descriptive statistics

Table 1, Panel A reports the distribution of the acquisitions in the full sample by acquisition year. As the table shows, there is no clustering of acquisitions in any year, as acquisitions are almost evenly distributed by calendar year, although the number of deals concluded in 2000 is slightly higher than the number of deals in the other years.

The distribution of acquisitions resulting in a goodwill impairment loss by September 2009 listed by acquisition year is provided in Panel

²³ The database most commonly used to draw M&A transactions data is the Thomson Reuters SDC (Securities Data Company) database. The Thomson One Banker database provides the same data in the Deals Analysis section.

²⁴ For the majority of companies in my sample the fiscal year-end is December 31st, therefore the audited annual reports for fiscal 2009 were not yet available.

B of Table 1. Acquisitions resulting in a write-off are nearly 50% of the deals in my sample.²⁵ Compared with earlier studies this is indeed a prominent number²⁶ and suggests that the enactment of SFAS 142 in fact resulted in more goodwill impairments being recognized in financial statements and thus likely in an improved ability of accounting standards to reveal the overstatement and/or the deterioration of the firms' goodwill.

The table indicates that the frequency of subsequent goodwill impairments does not follow a well-defined pattern, except for a steady decline of the number of impairments for the transactions completed during the last five years of the sample. Overall, the table shows that although the number of acquisitions consummated from 1999 to 2002 is nearly the same as the number of deals concluded from 2003 to 2007, the number of impairments for the earlier year acquisitions is quite larger than for later year deals. This reduction is likely inherent to the sample selection, as I did not track the acquisitions beyond September 2009 (i.e. the sample is right-truncated).

Moreover, Panel C of Table 1 shows a detail of the number of acquisition in the impairment sample classified by the year in which the impairment was recognized. The majority of losses (52.67%) were recognized in 2002 and 2008; the remaining goodwill impairments are almost evenly distributed across the other nine years included in the analysis. A 76% of 2002 impairments (17.81% of the impairments' total number) were recorded "below the line" as a cumulative effect of change in accounting principle. As required by SFAS 142 goodwill impairment losses recognized as a result of the transitional impairment test should be presented in the income statement between the captions *extraordinary items* and *net income as cumulative effect of change in accounting principles*,²⁷ and thus transitional losses do not affect income from continuing operations. Perhaps this result is not surprising, as it further supports findings of some previous studies demonstrating that firms' managers in fact used the discretion allowed by accounting standards to avoid hitting earnings.²⁸ As for 2008, the increased number of losses is likely to be the effect of the share prices' decline caused by the financial crisis that affected the fair values of the reporting units. This is, at least, what many companies claim in the financial statements notes. However, the large number of impairments in just one year seems also consistent with the so called big baths earnings management; that is, when profits are already low, companies will make them looking even worse taking large non-recurring write-offs in order to cleaning up their books with a modest reputational harm.²⁹ Indeed, this, if borne out by the evidence, could raise some further concern about the credibility of goodwill numbers, and thus testing for the presence of big bath accounting likely represents a relevant topic for future research.

Finally, Panel D of Table 1 shows the timing of goodwill impairment losses recognition. On average, a goodwill impairment loss is recorded between two and three years subsequent to the acquisition for the deals in my sample. A 9.41% of the impairments were recorded in the

same year of the acquisition, a 38.17% of the impairments occurred within one year of the acquisition and a 61.83% within two years. Only 23.41% of the write offs took place four or more years following the acquisition. These results are unexpected, because the immediate impairment of the acquired goodwill may be interpreted either as inaccuracy by the acquiring firm's management in performing the due diligence process before the acquisition or as a mistake in determining the acquisition price. Conversely, as time passes, changes in a firm's management are more likely and new managers are generally more inclined to impair goodwill as a consequence of someone else errors. In addition, Hayn and Hughes (2006) show that on average goodwill write-offs lag behind the acquisition by an average of four to five years, for their sample of acquisitions between 1988 and 1998. Compared with their results, my findings suggest that mandating the impairment test of goodwill at least annually, likely improved the ability of reporting standards to reveal situations in which manager overpaid for the target at acquisition, resulting in an overstatement of the goodwill value (i.e. components 5 and 6 were not minimized) intentionally or because of non intentional inaccuracy.

Finally, in interpreting the results above it should be taken into consideration that my sample is truncated because I did not follow the acquisitions after September 2009. The deals consummated during the last two years (2006 and 2007) are 204, or a 21.95% of the full sample. For this group, the percentage of goodwill impairments captured is 26.47%, significantly less than the 46.75% of impairments captured for earlier acquisitions, which were followed for a longer period. Therefore, future research will be needed to confirm these results over a greater number of years.

Table 2 presents the frequency tables of ordinal variables (Panel A), and the descriptive statistics of continuous variables (Panel B) included in my model.

Table 3 Panel A shows the descriptive statistics on continuous predictors of overpayment for the impairment and non-impairment samples. The mean amount of premium paid by the acquiring firms in the impairment sample does not differ significantly from that paid by the acquiring firms in the non-impairment sample. As signaled by SIZE statistics, target companies acquired by impairment firms are on average slightly smaller than those acquired by non-impairment firms, but the difference is irrelevant. On the other hand, the two groups differ considerably with respect to three of the overpayment indicators, and these dissimilarities are consistent with greater overpayment for the acquisitions in the impairment sample. The amount of goodwill represents on average the 61.9% of the purchase price paid for the impairment group as compared with a 55.2% for the non-impairment group; the acquisition price paid in excess over the book value of assets of the target firm (BVPREM) for the impairment sample (4.77) is larger than for the non-impairment sample (2.77); finally, the incidence of the acquirer's stock in the consideration shows a 18.5% difference between the two samples, ranging from a 31.4% for the non-impairment firms to a 49.9% for the impairment firms.

Panel B of Table 3 presents the bivariate association analysis between all continuous predictors. In order to determine whether the differences between the mean values of overpayment indicators of the two samples are statistically significant, I conducted an independent samples t-test, using the dichotomous variable ILOSS (occurrence of an impairment loss). As the table shows, the test found a significant (at 0.05) association between impairment losses and the book value premium, the amount of goodwill relative to the acquisition price, and the percentage of stock in the consideration. Differently from other authors³⁰ I did not found a significant difference between the two samples with respect to the premium paid by the acquiring firm. Overall the above results seem to corroborate the hypothesis that the seeds of

²⁵ In a table not reported here I provided the distribution of the acquisitions' sample and of both the impairment and non-impairment samples by industry. The transactions concentrate in three SIC divisions: manufacturing (D37-39, transportation equipment; measuring, analyzing, and controlling instruments, photographic medical and optical goods, watches and clocks; and miscellaneous manufacturing industries); transportation, communications, electric gas, and sanitary services (E); and services (I73, business services – especially SIC 737, computer programming, data processing, and other related services). Consistently, a 58.77% of total impairments were recognized by acquiring firms belonging to these SIC divisions. The largest number of write-offs occurred in machinery and electronics (D35-36, 98 impairments) and in business services (I73, 85 impairments). This is probably, at least in part, a consequence of the dot-com buckle during the period of 1999–2000, and the subsequent decline until 2003 (a 53.0%, or total of 98, of those impairments was recorded by the end of the 2nd quarter of 2003).

²⁶ Hayn and Hughes (2006) reported a total of 180 acquisitions resulting in a write offs by 2001 – only a 14% of the 1276 acquisitions occurred in the eleven-year period from 1988 to 1998.

²⁷ SFAS 142, par. 56.

²⁸ Beatty and Weber (2006).

²⁹ Henry and Schmitt (2001).

³⁰ Hayn and Hughes (2006).

Table 1
Distribution of sample acquisitions.

Panel A: Distribution of sample acquisitions by year			
Acquisition year	Frequency	Percent	Cumulative percent
1999	109	11.7	11.7
2000	150	16.1	27.9
2001	111	11.9	39.8
2002	79	8.5	48.3
2003	83	8.9	57.3
2004	92	9.9	67.2
2005	101	10.9	78.0
2006	91	9.8	87.8
2007	113	12.2	100.0
Total	929	100.0	

Panel B: Distribution of acquisitions resulting in a goodwill impairment by September 2009			
Acquisition year	Number of acquisitions	Number of acquisitions resulting in a goodwill impairment by September 2009	Percentage of acquisitions resulting in a goodwill impairment by September 2009
1999	109	63	57.80%
2000	150	95	63.33%
2001	111	55	49.55%
2002	79	35	44.30%
2003	83	24	28.92%
2004	92	32	34.78%
2005	101	35	34.65%
2006	91	30	32.97%
2007	113	24	21.24%
1999–2002	449	248	55.23%
2003–2007	480	145	30.21%
Total	929	393	42.80%

Panel C: Distribution of the impairment sample by impairment year												
Acquisition year	Impairment year											N impairment
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	
1999	1	7	14	23	2	3	3	1		9		63
2000		7	26	37	3	1	4	2	4	10	1	95
2001			7	23	6	2		3	3	11		55
2002				9	10		2	5		9		35
2003					2	4	3	4	4	7		24
2004						2	11	6	3	10		32
2005							3	5	5	21	1	35
2006								2	8	17	3	30
2007									1	21	2	24
Total impairment by year	1	14	47	92	23	12	26	28	28	115	7	393
% impairment by impairment year	0.25%	3.56%	11.96%	23.41%	5.85%	3.05%	6.62%	7.12%	7.12%	29.26%	1.78%	100%

Panel D: Timing of goodwill impairment		
Number and percentage of goodwill impairments occurring	N	%
In the acquisition year	37	9.41%
One year following the acquisition	113	28.75%
Two years following the acquisition	93	23.66%
Three years following the acquisition	58	14.76%
Four years following the acquisition	21	5.34%
Five years following the acquisition	18	4.58%
Six years following the acquisition	18	4.58%
Seven years following the acquisition	17	4.33%
Eight years following the acquisition	9	2.29%
Nine years following the acquisition	9	2.29%
Total	393	100.00%

subsequent impairment losses are shown at the time of the original (overpaid) acquisition. Furthermore, the use of stock rather than cash as a mode of consideration and the larger amount of goodwill over the purchase price as indicators of the likelihood of an impairment loss, support the hypothesis that the target was in fact overpaid at acquisition and that the overpayment rather than subsequent events caused the occurrence of a goodwill impairment loss.

However, discussed differences between the overpayment indicators in the impairment and non-impairment samples may arise from the sample selection. Because I did not consider goodwill impairments occurred after September 2009, earlier acquisitions could be more likely

to belong to the impairment sample whereas later acquisitions could be more likely to fall into the non-impairment sample. As a result the reported differences between the samples may be the effect of the acquisition timing rather than be related to characteristics of the original acquisition. To control for the effect of acquisition timing I divided the full sample into two groups, acquisitions completed from 1999 to 2003 and acquisitions completed from 2004 to 2007. The results (not reported) show that this is not the case, as the differences between the mentioned overpayment indicators are present and significant in each period, and thus they are not due to the time a transaction takes place.

Table 2
Variables – descriptive statistics.

Panel A: Frequency tables of ordinal variables					
	N	%	Cumulative %		
<i>ILOSS</i>					
No impairment	536	57.7	57.7		
Impairment	393	42.3	100.0		
Total	929	100.0			
<i>CROSS</i>					
Cross-border deal	94	10.1	10.1		
Domestic deal	835	89.9	100.0		
Total	929	100.0			
<i>FOCUS</i>					
Diversifying	338	36.4	36.4		
Focus enhancing	591	63.6	100.0		
Total	929	100.0			
<i>CHALL</i>					
Otherwise	883	95.0	95.0		
Multiple bidders	46	5.0	100.0		
Total	929	100.0			
Panel B: Descriptive statistics of continuous variables					
Variables	N	Minimum	Maximum	Mean	Std. deviation
STOCK	929	.0000	1.0000	.392771	.4394147
GWEV	929	.0054	16.0312	.597952	.6193248
SIZE	929	1.6500	78870.6100	1477.802668	5226.7117071
PREM	929	-.9926	3.5198	.417265	.5685037
BVPREM	929	-.9962	195.9144	3.616562	12.0195386

Variable definitions:

ILOSS = Occurrence of a goodwill impairment loss. Dummy variable equals to 1 if goodwill recognized in an acquisition was subsequently impaired, and 0 otherwise.

CROSS = Geographic location of the acquisition. Dummy variable equals to 1 if the target is foreign company (crossborder transactions) and 0 if the target is a US company (domestic transactions).

FOCUS = Dummy variable equal to 1 if the target belongs to the same 2digit SIC code as the acquirer (focus enhancing acquisition) and 0 otherwise (diversifying acquisition).

CHALL = Presence of multiple bidders. Dummy variable equals to 1 if multiple bidders were competing for the target and 0 otherwise.

STOCK = Percentage of acquirer's stock in the consideration.

GWEV = Percentage of the enterprise value of the target firm (purchase price plus financial debt assumed including the net deferred tax position) that the acquirer allocated to goodwill.

SIZE = Market value of assets of the target firm measured 4 weeks prior to the date of the announcement of the transaction.

PREM = Price premium paid for the target calculated as follows: Enterprise Value of the target less market value of assets of the target 4 weeks prior to the announcement date, divided by the market value of assets of the target 4 weeks prior to the date of the announcement of the transaction.

BVPREM = Book value premium, calculated as follows: Enterprise value of the target less book value of assets of the target as of the date of the most current financial information prior to the date of the transaction.

5.2. Logistic regression analysis

Table 4 presents the results of the regression model for predicting impairment of goodwill based on the overpayment indicators measured at acquisition. The continuous predictors were binned in appropriate intervals before being inserted in the logistic model. To select the significant predictors I used the backward elimination approach, which is the preferred method of exploratory analyses.

As Panel C of Table 4 shows, among the overpayment indicators, only the percentage of stock in the consideration (*STOCK*), the amount of the purchase price assigned to goodwill (*GWEV*), and the book value premium are significant in explaining the occurrence of a subsequent goodwill impairment loss.

Consistent with the expectations, the results show that higher *STOCK* and *GWEV* increase the risk of having an impairment loss. Conversely, the *BVPREM* has a negative association with the dependent variable. The other variables (*CROSS*, *FOCUS*, *CHALL*, *SIZE* and *PREMIUM*) have no predictive power.

In particular, the percentage of stock in the consideration (*STOCK*) is the most significant predictor and has a strong and positive association with the probability of an impairment loss. The estimated exponential of coefficient, or odds ratio ($\text{Exp}(B)$) of *STOCK* tells that acquisitions paid almost entirely by stock (more than 88% of stock in the consideration) have a risk of impairment 2.612 times higher than acquisitions paid by a lower percentage of stock, or by cash. Consistent with results of previous studies, this finding confirms the hypothesis that managers are more prone to overpay for the target in stock acquisitions, as stock is likely regarded as a cheap (possibly inflated) currency.

The amount of the purchase price assigned to goodwill (*GWEV*) is also strongly and positively related to the impairment loss event. That is, the relative risk of having an impairment loss increases the higher the amount of goodwill on the acquisition price. When the value of goodwill is more than 67% of the purchase price the risk of having an impairment loss is 81% higher than the risk of having an impairment loss when goodwill is equal to a 46% of the purchase price, or less. Thus, as suggested by descriptive statistics, large values of the acquired goodwill are likely to include elements other than the value of the expected synergies or of the going-concern, and are therefore unlikely to give a realistic representation of the underlying economics, which should be a serious cause of concern for standard setters and financial statements users about the reliability of those numbers.

The book value premium (*BVPREM*) has a negative and relatively weak association with the dependent variable that is the risk of having an impairment loss decreases when the book value premium increases. At its highest level (the difference between the purchase price and the target book value of assets is more than 2.16 times higher than the target book value of assets) this indicator leads to a decrease of 36% of the overall risk of having an impairment loss.

The lack of predictive power of some other overpayment indicators included in the model should be interpreted carefully. *CHALL* (whether multiple bidders were competing for the target) is likely not significant because the majority of the acquisitions in my sample were not concluded in auction-like situations. As Table 2 shows, there was more than one bidder only in 46 (4.95%) transactions. Fifteen (32.6%) of these 46 transactions gave rise to an impairment of goodwill and 31 (67.4%) did not. Similarly, as most of the analyzed transactions (835 or an 89.9%) involved US targets, *CROSS* (the geographic location of the combining firms) is probably irrelevant. Among the cross-border transactions 35 (37.6%) resulted in an impairment loss whereas 58 (62.3%) did not result in an impairment loss. This may confirm that these two variables are irrelevant in the task of predicting impairments of goodwill, however they may still have some predictive power, as signaled by the relative percentage of impairments both in the 46 auction deals group and in the 95 cross-border deals group. Thus further research is required to better assess the weight of these predictors as indicators of subsequent goodwill impairment.

As for *FOCUS*, logistic regression shows that the strategy underlying an acquisition, whether it focuses at enhancing or aims at diversifying the acquirer's business, is irrelevant to predict the occurrence of a goodwill impairment loss. Finally, the size of the acquired firm, and, contrary to the expectations, the premium paid by the acquirer, resulted not statistically significant.

Panel D of Table 4 reports the results of the Hosmer and Lemeshow statistic. In this case, I accept the hypothesis that the model adequately fits the data (Sig. 0.145).

As the classification table (Panel B of Table 4) further shows, overall the model correctly classifies 64.4% of the observations. Specifically, an 84.4% of effective not impairments and a 37.4% of effective impairments would have been correctly classified.

6. Concluding remarks

The aim of this study was to shed light on the reliability of accounting goodwill numbers by testing whether the cause of many goodwill

impairment losses is the overpayment for the target at the acquisition date, rather than the post-acquisition performance deterioration of the reporting unit the acquired goodwill was allocated to. If a goodwill impairment loss can be predicted based on certain measures indicating overpayment at acquisition, it means that SFAS 141 at least in part fails to avoid that component other than core goodwill being included in goodwill.

A second purpose of this study was to assess whether the impairment test imposed by SFAS 142 improved the timelines of recognizing goodwill impairment losses, helping to mitigate the above described effect of SFAS 141.

I tested these hypotheses for a sample of 929 acquisitions made by US public traded companies over the nine-year period from 1999 to 2007. Using a logistic regression analysis I examined whether the occurrence of the observed goodwill impairment losses could have been predicted based on some overpayment indicators measured at the acquisition date.

Firstly, I found that a 37.4% of goodwill impairment losses in my sample were predictable based on these overpayment indicators, thus supporting the hypothesis that these losses were at least partially the consequence of overpayment for the target at acquisition. More specifically my analysis shows that the occurrence of a goodwill impairment loss is positively and strongly related with the percentage of stock in the consideration. That is, the higher the percentage of the purchase price paid for with the acquiring firm's stock, the higher the likelihood that the acquisition will result in a goodwill impairment loss. This result suggests that on average managers of the acquiring firms are more prone to overpay in stock acquisition rather than in cash acquisition probably because they are generally more sensitive to potential loss of

cash in cash acquisitions than to the dilutive effect of stock in stock acquisitions. In addition, the occurrence of a goodwill impairment loss is positively and strongly related with the percentage of the purchase price assigned to goodwill. The higher the percentage of goodwill over the purchase price, the higher the likelihood of having a subsequent goodwill impairment loss. This result suggests that large amounts of goodwill with respect to the price paid are more likely to include elements other than the synergies stemming from the combination and the value of the target as a going-concern.

These results are troubling. On one hand they confirm findings of some previous studies on goodwill write-offs prediction, providing additional evidence.

On the other hand, none of these few studies analyzed a relatively large number of years in the post-SFAS 141 era, as my study did. Thus it adds some relevant indications: as my model correctly predicts roughly 40% of goodwill impairment losses in the sample, the provisions of SFAS 141 on measuring goodwill are at least partially unable to warrant that components other than core goodwill being minimized. This result is important both for financial statement users and for standard setters as it raises some concern about the reliability of prominent accounting goodwill numbers included in the financial statements of many corporations and their ability to carefully represent the underlying economics.

A second finding of my study is that on average the time lag between the acquisition and the recognition of a goodwill impairment loss ranges from two to three years. Only one earlier analysis gave attention to the time lag between the acquisition date and the occurrence of subsequent goodwill impairment losses during the pre-SFAS 142 years finding that the average number of years between the acquisition and

Table 3
Bivariate analysis.

Panel A: Descriptive statistics on overpayment indicators for the impairment and non-impairment samples										
	Impairment (Y/N)		N	Mean	Std. deviation	Std. error mean				
STOCK	Dimension 1	No impairment	536	.313790	.4099134	.0177387				
		Impairment	393	.499545	.4553792	.0229708				
GWEV	Dimension 1	No impairment	536	.552796	.2784301	.0120488				
		Impairment	393	.619503	.4377713	.0220826				
PREM	Dimension 1	No impairment	536	.424001	.5442852	.0235535				
		Impairment	393	.414021	.5958735	.0300578				
BVPREM	Dimension 1	No impairment	536	2.770505	6.3553379	.2750224				
		Impairment	393	4.779151	16.8732167	.8511412				
SIZE	Dimension 1	No impairment	536	1531.643904	5.9780096E3	258.6937738				
		Impairment	393	1409.383079	4.0083686E3	202.1954504				

Panel B: Independent samples t-test										
		Levene's test for equality of variances		t-Test for equality of means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean difference	Std. error difference	95% confidence interval of the difference	
									Lower	Upper
STOCK	Equal variances assumed	35.114	.171	-6.503	925	.000	-.1857551	.0285633	- .2418114	- .1296988
	Equal variances not assumed			-6.400	791.831	.000	-.1857551	.0290228	- .2427258	- .1287845
GWEV	Equal variances assumed	1.007	.316	-2.829	925	.005	-.0667073	.0235809	- .1129856	- .0204289
	Equal variances not assumed			-2.652	619.748	.008	-.0667073	.0251559	- .1161083	- .0173062
PREM	Equal variances assumed	2.572	.109	.265	925	.791	.0099796	.0376654	- .0639399	.0838991
	Equal variances not assumed			.261	799.505	.794	.0099796	.0381869	- .0649789	.0849381
BVPREM	Equal variances assumed	22.846	.096	-2.519	925	.012	-2.0086455	.7973413	- 3.5734533	- .4438378
	Equal variances not assumed			-2.246	474.326	.025	-2.0086455	.8944711	- 3.7662616	- .2510295
SIZE	Equal variances assumed	.534	.465	.351	925	.725	122.2608256	347.9010743	- 560.5061322	805.0277834
	Equal variances not assumed			.372	917.541	.710	122.2608256	328.3374312	- 522.1187215	766.6403727

Variable definitions: Variables included in the model are defined below Table 2.

Table 4
Logistic regression.

Panel A: R-square statistics			
Model summary			
Step	–2 log likelihood	Cox & Snell R square	Nagelkerke R square
1	1195.592 ^a	.071	.095
2	1195.594 ^a	.071	.095
3	1195.761 ^a	.071	.095
4	1195.879 ^a	.070	.095
5	1196.380 ^a	.070	.094
6	1200.054 ^a	.066	.089

Panel B: Classification table^b

Step	Observed	Predicted	Percentage CORRECT		
			No impairment	Impairment	
Step 1	Impairment (Y/N)	No impairment	438	96	82.0
		Impairment	234	159	40.5
		Overall percentage			64.4
Step 2	Impairment (Y/N)	No impairment	438	96	82.0
		Impairment	234	159	40.5
		Overall percentage			64.4
Step 3	Impairment (Y/N)	No impairment	444	90	83.1
		Impairment	243	150	38.2
		Overall percentage			64.1
Step 4	Impairment (Y/N)	No impairment	443	91	83.0
		Impairment	243	150	38.2
		Overall percentage			64.0
Step 5	Impairment (Y/N)	No impairment	439	95	82.2
		Impairment	240	153	38.9
		Overall percentage			63.9
Step 6	Impairment (Y/N)	No impairment	450	84	84.3
		Impairment	246	147	37.4
		Overall percentage			64.4

Panel C: Results of the regression model

Variables in the equation							
	B	S.E.	Wald	Df	Sig.	Exp(B)	
Step 1 ^c	GWEVBin		11.996	2	.002		
	GWEVBin(1)	.457	.175	6.816	1	.009	1.579
	GWEVBin(2)	.600	.181	11.027	1	.001	1.823
	SIZEBin			3.023	2	.221	
	SIZEBin(1)	.241	.176	1.887	1	.170	1.273
	SIZEBin(2)	.295	.180	2.694	1	.101	1.344
	PREMBin			.167	2	.920	
	PREMBin(1)	.038	.175	.046	1	.831	1.038
	PREMBin(2)	–.036	.190	.036	1	.850	.965
	BVPREMBin			9.962	2	.007	
	BVPREMBin(1)	–.538	.179	9.065	1	.003	.584
	BVPREMBin(2)	–.470	.194	5.848	1	.016	.625
	STOCK	.987	.157	39.540	1	.000	2.683
	CROSS	.081	.233	.121	1	.728	1.084
FOCUS	.007	.144	.003	1	.959	1.007	
CHALL	–.219	.332	.436	1	.509	.803	
Constant	–.867	.304	8.108	1	.004	.420	
Step 6	GWEVBin		12.309	2	.002		
	GWEVBin(1)	.477	.174	7.522	1	.006	1.611
	GWEVBin(2)	.596	.180	11.024	1	.001	1.815
	BVPREMBin			9.552	2	.008	
	BVPREMBin(1)	–.495	.173	8.166	1	.004	.610
	BVPREMBin(2)	–.438	.177	6.114	1	.013	.646
	STOCK	.960	.152	39.674	1	.000	2.612
	Constant	–.642	.148	18.892	1	.000	.526

Table 4 (continued)

Panel D: Results of the Hosmer and Lemeshow's test for assessing the model fit			
Step	Chi-square	df	Sig.
1	14.020	8	.081
2	14.680	8	.066
3	10.686	8	.220
4	3.450	8	.903
5	10.972	8	.203
6	12.134	8	.145

^a Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

^b The cut value is .500.

^c Variables entered on step 1: GWEVBin, SIZEBin, PREMBin, BVPREMBin, STOCK, CROSS, FOCUS, CHALL.

the recognition of a goodwill impairment loss ranged from four to five years. Analyzing impairments occurred after the enactment of SFAS 142 during the seven-year period to date, my results provide additional evidence showing that SFAS 142 requirements for annual impairment tests in fact improved the timeliness of recognizing goodwill write-offs. This result substantiates the hypothesis that SFAS 142 eventually helps to mitigate the effects of SFAS 141 resulting in an improved ability of accounting standards to capture situations in which goodwill is overstated and thus should be written down, and confirms that SFAS 142 was indeed necessary.

In conclusion, this work raises some issues for future research. First, my predictive model could be expanded to include other indicators such as the overpricing of the acquiring firm's shares at acquisition and other performance indicators of both the acquiring and the target firm.

Second, whereas I studied whether the occurrence of a goodwill impairment loss is predictable at acquisition based on some variable indicating overpayment by the acquiring firm it could be interesting to further deepen the analysis testing whether and to what extent these (or other) factors explain the magnitude of a goodwill impairment loss.

Finally, further research is needed to assess how the provisions of accounting standards could be improved to avoid the overstatement of the goodwill value at the acquisition date.

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